CHAPTER 18. ECM EVALUATIONS

1800. PURPOSE.

a. Most RFI experienced by FAA facilities is of an uncontrollable and unexpected nature. In many instances, FAA systems have methods of filtering out this RFI. However, there is one type which is serious but with which FAA usually has the luxury of being able to schedule, relocate or cancel. That RFI is scheduled ECM military operations. Unfortunately, ECM is sometimes conducted without prior coordination by the military. In this case, the problem has to be handled just as any unexpected RFI.

b. ECM missions are military exercises whereby electromagnetic signals are radiated intentionally or chaff is dropped to cause RFI to other military units. These missions are conducted on various narrow band and wide band portions of the spectrum. These radiations can cause severe RFI to FAA facilities, particularly GPS, TACAN and radar. While training in electronic jamming and dropping chaff is deemed necessary by the military to keep aircrews combat-ready, it can also present a serious hazard to air safety. FAA must carefully review requests for this type of training. FAA policy on ECM operation is summarized in the following:

(1) The AF technical analysis performed by the applicable region evaluates the potential for NAS degradation. If the proposed ECM mission degrades the NAS, FAA will not concur with the operation. To accommodate DOD ECM training requirements, FAA will evaluate the possibility of NOTAMing affected facilities out to service (OTS) during specific mutually agreed upon times, on a case by case basis.

(2) The affected ARTCC or other designated FAA facility has final authority, based on current air traffic capacity, safety, weather or other valid reason, to allow an ECM mission to proceed as scheduled or to refuse concurrence.

(3) ASR forwards the coordinated FAA response after the regional technical AF analysis and coordination with AT. ASR then assigns an administrative ECM control number to authorized operations. The military unit will refer to this control number when contacting the ARTCC for final approval to dispense chaff or to conduct other ECM activity.

(4) ASR will evaluate all ECM requests which could impact GPS operations (for example, 1559-1610 MHz band) and all Joint Tactical Information Distribution System (JTIDS).

1801. DEFINITIONS.

a. A Military Operating Area (MOA) is the established airspace outside positive control areas to separate/segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.

b. A Restricted Area is airspace designated under FAR Part 73 within which the flight of the aircraft, while not wholly prohibited, is subject to restriction. Restricted areas are designated when determined necessary to confine or segregate activities considered to be a danger to nonparticipating aircraft.

c. A Warning Area is airspace of defined dimensions over international waters that contains activity which may be hazardous to nonparticipating aircraft.

d. "Stop Buzzer/Chaff" or "Cease Buzzer/Chaff" are terms normally transmitted over "guard" channels 121.5 MHz and 243.0 MHz which directs any military unit to stop electronic jamming or to stop dropping chaff, as appropriate. It is important to realize that because of its slow fall rate and unpredictable winds, chaff may take several hours to reach the ground, with uncontrollable RFI occurring until the chaff is at ground level..

1802. APPLICABLE REGULATIONS.

a. Order 7610.11, Joint ASM/ATO Procedures for Coordinating ECM Mission Requests, establishes internal FAA coordination procedures. It states that FMO's will coordinate with their respective AT divisions when reviewing ECM proposals and establishes ASR as the focal point for sending out the authorization to the military for ECM operations after regional analysis is completed.

b. Order 7610.4, Special Military Operations describes general guidelines for military units for requesting and performing ECM operations.

c. Order 7400.2, Procedures for Handling Airspace Matters is primarily used by military units when they need to establish new special use airspace. It states that desired ECM operations must be considered during the planning stages of expanding or establishing new special use airspace.

d. DOD Joint ECM Regulation (CJCSI 3212.01, Performing Electronic Warfare in the United States and Canada) details ECM approval procedures for use by the four military services. The military regulation is coordinated with FAA to ensure that these procedures are adequate to protect critical safety communications, navigation and surveillance systems from interference. Figure 18-1 indicates those frequency bands, designated as "National" coordination with a superscript "1," which must be coordinated and approved by the FAA prior to beginning ECM operations.

1803. RESPONSIBILITIES.

a. ASR shall:

(1) Establish guidance to ensure consistency for authorizing ECM activity throughout the regions.

(2) Provide the written, consolidated FAA response and authorization to military ECM requests based on FMO analysis and coordination.

(3) Assign an administrative ECM control number for reference.

b. Regional FMO's shall:

(1) Coordinate with their AT divisions and applicable FAA ARTCC's and facilities as needed to determine whether FAA facilities could be impacted by the proposed ECM mission.

(2) Perform a thorough analysis of the proposed ECM impact on FAA systems within their region.

(3) Provide a written NAS facilities ECM impact analysis to ASR for the proposed ECM along with any recommendations for restrictions; e.g., altitude, time of day, prohibited frequencies, etc.

1804. ANALYSIS OF ECM REQUEST.

a. The following general policy outlines the minimum analysis required when evaluating ECM proposals.

(1) FAA does not allow its systems to experience RFI intentionally because of the possibility of degradation of safety of flight.

(a) Military entities are requested to accept restrictions which will allow ECM training without RFI to FAA systems.

(b) In those cases where FAA allows RFI in order to accommodate military training, we coordinate closely with affected facilities and NOTAM them OTS where necessary.

(2) FAA does not allow ECM training on 1030 MHz, 1090 MHz, 108-137 MHz, 960-1215 MHz, 1559-1610 MHz or 5030-5090 MHz except under highly restrictive and limited instances.

(3) There are certain frequency bands which require special consideration because they are used by civil aviation for critical aeronautical radionavigation operations. However, they are not centrally managed by the FAA. For example, these bands include 4200-4400 MHz (radar altimeter) and 13.25-13.40 GHz (airborne weather radar). Active ECM operations are seldom performed in these bands, but chaff can impact these airborne systems. Care will be taken that chaff operations are not allowed near air routes so that such airborne systems do not receive interference.

b. The following general procedures will be used in evaluating ECM electronic jamming proposals.

(1) Determine whether the electronic jamming is to be done in a frequency band in which FAA supports air traffic services. FAA only evaluates those jamming operations which could cause RFI to FAA operations.

(2) Determine whether the jamming is to be done in an area within RLOS and in a frequency band of FAA concern. **Note**: consider terrain shielding, if applicable.

(3) Determine whether the power level will be sufficient to cause RFI to FAA facilities if the jamming is to be within RLOS.

(4) Determine possible restrictions (e.g., altitude limitations, possible use of spot frequencies rather than bands, etc.) which could be imposed to allow the jamming.

c. The final general guidelines shall be followed when evaluating ECM chaff proposals:

(1) Only consider the primary and "second time around" targets when evaluating chaff. Experience has shown that "third (or higher) time around" targets are not detected by FAA radars.

(2) Chaff normally interferes with radar. However, there is a small possibility that it could cause RFI to microwave systems such as RCL if dropped within 500 feet of the microwave beam.

(3) Determine whether the chaff is designed to affect a frequency band in which FAA has radar or microwave facilities.

(4) If the chaff is designed to affect a frequency of interest to FAA, determine whether it is to be within RLOS. **Note**: terrain shielding may be considered in this evaluation. See (1) above regarding "second time around."

1805. CONCLUSIONS. Analysis of ECM operations, both electronic jamming and chaff, is complicated and requires good engineering practices. FAA is committed under Title 49. U.S.C., to provide a safe and efficient NAS. This Act also requires the FAA to make every effort to accommodate necessary military ECM training. By careful analysis and proper procedures, FAA can permit most DOD ECM training without impacting aeronautical safety.

FIGURE 18-1a. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

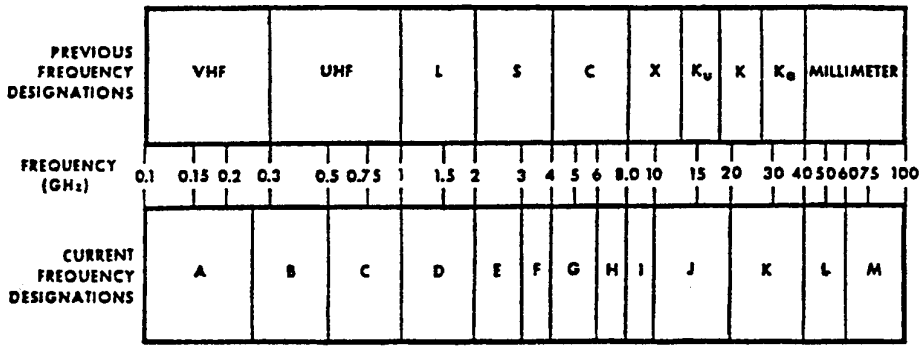

Figure F-1. Frequency Band Designations

2. Frequency Band Status

a. Canada. In the frequency list under Canada, frequency bands designated as candidates for EW applications are shown as "National." EW is prohibited in all other bands unless authorized through national coordination by NDHQ/DECSS 5 (Canadian MILDEP FMO).

b. United States. The following list of frequencies has been coordinated at the national level. The status of the frequency bands for EW in the United States are annotated below as unrestricted, Local, National, or Authorized Tactical (Auth Tac) use only. Each status are defined in attachment 1 of the main regulation. EW activity in the United States requires clearance in a specified geographic area.

FIGURE 18-1b. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

Table F-2. Level of Frequency Coordination Required by Band, Channel, and Frequency Band and Range.

Channel	(MHz)	United States	Canada
A-1	0-25	National[1]	
A-2	25-50	National[1]	National
A-3	50-75		
	[50-54	Unrestricted	
	54-73	Local (FCC)	
	73-75.2]	National[1]	National
A-4	75.2-100		
	[75.2-75.4	National	
	75.4-100]	Local (FCC)	
A-5	100-125		
	[100-108	Local (FCC)	
	108-125]	National[1]	
A-6	125-150		
	[125-138	National[1]	National
	138-150]	Auth Tac	
A-7	150-175		
	[150-162	Auth Tac	National
	162-174	National[1]	National
	174-175]	Local (FCC)	
A-8	175-200	Local (FCC)	
A-9	200-225		
	[200-216	Local (FCC)	
	216-220	National	
	220-225]	Unrestricted	
A-10	225-250		
	225-226	National[1]	
	226-229	Auth Tac	National
	229-230	National[1]	
	230-239	Auth Tac	National
	239-240	National[1]	
	240-242.5	Auth Tac	National
	242.5-243.5	National (Guard)	
	243.5-248	Auth Tac	National
	248-249	National[1]	
	249-251	Auth Tac	National
B-1	250-275		
	251-252	National[1]	
	252-253	Auth Tac	National
	253-258	National[1]	
	258-259	Auth Tac	National
	259-260	National[1]	

FIGURE 18-1c. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

	260-263	Auth Tac	National
	263-264	National[1]	
	264-266	Auth Tac	National
	266-267	National[1]	
	267-269	Auth Tac	National
	269-271	National[1]	
	271-272	Auth Tac	National
	272-274	National[1]	
	274-275	Auth Tac	National
B-2	275-300		
	275-276	National[1]	
	276-277	Auth Tac	National
	277-280	National[1]	
	280-281	Auth Tac	National
	281-283	National[1]	
	283-284	Auth Tac	National
	284-286	National[1]	
	286-287	Auth Tac	National
	287-292	National[1]	
	292-294	Auth Tac	National
	294-295	National[1]	
	295-296	Auth Tac	National
	296-297	National[1]	
	297-298	Auth Tac	National
	298-300	National [1]	
B-3	300-325		
	300-306	Auth Tac	National
	306-308	National[1]	
	308-316	Auth Tac	National
	316-324	National[1]	
	324-326	Auth Tac	National
B-4	325-350		
	326-342	National[1]	
	342-343	Auth Tac	National
	343-344	National[1]	
	344-345	Auth Tac	National
	345-347	National[1]	
	347-348	Auth Tac	National
	348-356	National[1]	
B-5	350-375		
	356-357	Auth Tac	National
	357-358	National[1]	
	358-360	Auth Tac	National
	360-361	National[1]	
	361-362	Auth Tac	National
	362-364	National[1]	

FIGURE 18-1d. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

	364-369	Auth Tac	National
	369-372	National[1]	
	372-377	Auth Tac	National
B-6	375-400		
	377-378	National[1]	
	378-379	Auth Tac	National
	379-382	National[1]	
	382-385	Auth Tac	National
	385-386	National[1]	
	386-387	Auth Tac	National
	387-389	National[1]	
	389-390	Auth Tac	National
	390-394	National[1]	
	394-396	Auth Tac	National
	396-398	National[1]	
	398-400	Auth Tac	National
B-7	400-425		
	[400-420	National[1]	National
	420-425]	Unrestricted	National
B-8	425-450	Unrestricted	National
B-9	450-475	National	National
B-10	475-500	National	
C-1	500-550		
	[500-512	National	
	512-550]	Local (FCC)	
C-2	550-600	Local (FCC)	
C-3	600-650		
	[600-608	Local (FCC)	
	608-614	National	
	614-650]	Local (FCC)	
C-4	650-700	Local (FCC)	
C-5	700-750	Local (FCC)	
C-6	750-800	Local (FCC)	
C-7	800-850		
	800-806	Local (FCC)	
	806-850]	National	
C-8	850-900	National	National
C-9	900-950		
	(900-902	National	National
	902-928	Unrestricted	National
	928-950]	National[1]	National
C-10	950-1,000	National[1]	National
D-1	1,000-1,100		
	[1,000-1,075	National[1]	
	1,075-1,100]	National[1]	
D-2	1,100-1,200		

FIGURE 18-1e. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

	[1,100-1,105	National[1]	
	1,105-1,200]	National[1]	
D-3	[1,200-1,215	National[1]	
	1,215-1,300]	National[1]	National
	1,217-1,237	National[1]	National
D-4	1,300-1,400		
	[1,300-1,365	National[1]	National
	1,365-1,400]	National[1]	National
D-5	1,400-1,500		
	[1,400-1,429	National	
	1,429-1,435	Unrestricted	
	1,435-1,500]	National[1]	
D-6	1,500-1,600	National[1]	
	1,555-1,585	National[1]	
D-7	1,600-1,700	National[1]	
D-8	1,700-1,800	National[1]	
D-9	1,800-1,900	National[1]	National
D-10	1,900-2,000	National	
E-1	2,000-2,100	National	
E-2	2,100-2,200	National	
E-3	2,200-2,300	National	
E-4	2,300-2,400		
	[2,300-2,310	Unrestricted	
	2,310-2,390	National	National
	2,390-2,400]	Unrestricted	National
E-5	2,400-2,500		
	[2,400-2,450	Unrestricted	National
	2,450-2,500]	National	National
E-6	2,500-2,600	National	National
E-7	2,600-2,700	National	National
E-8	2,700-2,800	National[1]	National
E-9	2,800-2,900	National[1]	National
E-10	2,900-3,000	National[1]	National
F-1	3,000-3,100	Unrestricted	National
F-2	3,100-3,200	Unrestricted	National
F-3	3,200-3,300	Unrestricted	National
F-4	3,300-3,400	Unrestricted	National
F-5	3,400-3,500	Unrestricted	National
F-6	3,500-3,600	Unrestricted	National
F-7	3,600-3,700	Unrestricted	National
F-8	3,700-3,800	National	National
F-9	3,800-3,900	National	National
F-10	3,900-4,000	National	National
G-1	4,000-4,200	National	National
G-2	4,200-4,400	National[1]	National
G-3	4,400-4,600	Unrestricted	National

FIGURE 18-1f. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

G-4	4,600-4,800	Unrestricted	National
G-5	4,800-5,000		
	[4,800-4,990	Unrestricted	National
	4,990-5,000]	National	National
G-6	5,000-5,200	National[1]	National
G-7	5,200-5,400		
	[5,200-5,250	National[1]	National
	5,250-5,400]	Unrestricted	National
G-8	5,400-5,600	Unrestricted	National
G-9	5,600-5,800		
	[5,600-5,650	National[1]	National
	5,650-5,800]	Unrestricted	National
G-10	5,800-6,000		
	[5,800-5,925	Unrestricted	National
	5,925-6,000]	National	National
H-1	6,000-6,200	National	
H-2	6,200-6,400	National	
H-3	6,400-6,600	National	
H-4	6,600-6,800	National	
H-5	6,800-7,000	National	
H-6	7,000-7,200	National[1]	
H-7	7,200-7,400	National[1]	
H-8	7,400-7,600	National[1]	
H-9	7,600-7,800	National[1]	
H-10	7,800-8,000	National[1]	
I-1	8,000-8,200	National[1]	National
I-2	8,200-8,400	National[1]	National
I-3	8,400-8,600		
	[8,400-8,500	National[1]	National
	8,500-8,600]	Unrestricted	National
I-4	8,600-8,800	Unrestricted	National
I-5	8,800-9,000	Unrestricted	National
I-6	9,000-9,200	National[1]	National
I-7	9,200-9,400		
	[9,200-9,320	Unrestricted	National
	9,320-9,400]	Unrestricted	National
I-8	9,400-9,600		
	[9,400-9,500	Unrestricted	National
	9,500-9,600]	Unrestricted	National
I-9	9,600-9,800	Unrestricted	National
I-10	9,800-10,000	Unrestricted	
J-1	10,000-11,000		
	[10,000-10,550	Unrestricted	National
	10,550-11,000]	National	National
J-2	11,000-12,000		
	[11,000-11,700	National	National

FIGURE 18-1g. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

	11,700-12,000]	Local (FCC)	National
J-3	12,000-13,000	Local (FCC)	National
J-4	13,000-14,000		
	[13,000-13,250	Local (FCC)	National
	13,250-14,000]	Unrestricted	National
J-5	14,000-15,000	National[1]	National
J-6	15,000-16,000	National[1]	National
J-7	16,000-17,000	National[1]	National
J-8	17,000-18,000		
	[17,000-17,700	National	National
	17,700-18,000]	Local (FCC)	National
J-9	18,000-19,000	Local (FCC)	National
J-10	19,000-20,000		
	[19,000-19,300	Local (FCC)	National
	19,300-19,400	National	National
	19,400-19,700	Local (FCC)	National
	19,700-20,000]	Unrestricted	National
K-1	20,000-21,200	Unrestricted	
	21,200-22,000	National[1]	
K-2	22,000-24,000	National[1]	
K-3	24,000-26,000		
	[24,000-24,470	National	
	24,470-26,000	Unrestricted	
K-4	26,000-28,000		
	[26,000-27,525	Unrestricted	
	27,525-28,000]	Local (FCC)	
K-5	28,000-30,000	Local (FCC/USCG)	
K-6	30,000-32,000		
	[30,000-31,300	Local (FCC)	
	31,300-31,800	National	National
	31,800-32,000]	Unrestricted	National
K-7	32,000-34,000	Unrestricted	National
K-8	34,000-36,000	Unrestricted	National
K-9	36,000-38,000	Unrestricted	National
K-10	38,000-40,000		
	[38,000-38,600	Unrestricted	National
	38,600-40,000]	Local (FCC)	National
L-1	40,000-42,000	Unrestricted	
L-2	42,000-44,000	Unrestricted	
L-3	44,000-46,000	Unrestricted	
L-4	46,000-48,000	Unrestricted	
L-5	48,000-50,000	Unrestricted	

[1] FAA Coordination Required

FIGURE 18-1h. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

L-6	50,000-52,000		
	[50,000-51,400	Unrestricted	
	51,400-52,000]	National	
L-7	52,000-54,000	Unrestricted	
L-8	54,000-56,000		
	[54,000-54,250	National	
	54,250-56,000]	Unrestricted	
L-9	56,000-58,000	Unrestricted	
L-10	58,000-60,000		
	[58,000-58,200	Unrestricted	
	58,200-59,000	National	
	59,000-60,000]	Unrestricted	National
M-1	60,000-64,000	Unrestricted	National
M-2	64,000-68,000		
	[64,000-65,000	National	
	65,000-68,000]	Unrestricted	
M-3	68,000-72,000	Unrestricted	
M-4	72,000-76,000	Unrestricted	
M-5	76,000-80,000	Unrestricted	
M-6	80,000-84,000	Unrestricted	
M-7	84,000-88,000		
	[84,000-86,000	Unrestricted	
	86,000-88,000]	National	
M-8	88,000-92,000	National	
M-9	92,000-96,000	Unrestricted	National
M-10	96,000-100,000	Unrestricted	
N-1	100,000-110,000		
	[100,000-100,200	Unrestricted	
	100,200-102,000	National	
	102,000-105,000	Unrestricted	
	105,000-110,000]	National	
N-2	110,000-120,000		
	[110,000-116,000	National	
	116,000-120,000]	Unrestricted	
N-3	120,000-130,000	Unrestricted	
N-4	130,000-140,000	Unrestricted	
N-5	140,000-150,000	Unrestricted	
N-6	150,000-160,000	Unrestricted	
N-7	160,000-170,000		
	[160,000-164,000	Unrestricted	
	164,000-168,000	National	
	168,000-170,000]	Unrestricted	
N-8	170,000-180,000	Unrestricted	
N-9	180,000-190,000		
	[180,000-182,000	Unrestricted	
	182,000-185,000	National	

FIGURE 18-1i. DOD ECM FREQUENCY BANDS COORDINATION REQUIREMENTS

	185,000-190,000]	Unrestricted
N-10	190,000-200,000	Unrestricted
O-1	200,000-210,000	Unrestricted
O-2	210,000-220,000	
	[210,000-217,000	Unrestricted
	217,000-220,000]	National
O-3	220,000-230,000	Unrestricted
O-4	230,000-240,000	
	[230,000-231,000	National
	231,000-240,000]	Unrestricted
O-5	240,000-250,000	Unrestricted
O-6	250,000-260,000	
	[250,000-252,000	National
	252,000-260,000]	Unrestricted
O-7	260,000-270,000	Unrestricted
O-8	270,000-280,000	Unrestricted
O-9	280,000-290,000	Unrestricted
O-10	290,000-300,000	Unrestricted

1806. THRU 1899. RESERVED